



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
SOUTHEAST REGIONAL OFFICE
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KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

ROBERT W. GOLLEDGE, Jr.
Commissioner

February 26, 2004

Mr. Brian Creedon
Water Systems Manager
City of Brockton
Department of Public Works
39 Montauk Road
Brockton, Massachusetts 02301

RE: BROCKTON
Department of Public Works
Water Management Permit
#9P4-4-25-044.01
Program: Water Management Act
Action: Permit Approval

Dear Mr. Creedon:

Please find attached:

- Water Management Act Permit #9P4-4-25-044.01 (Taunton Basin) issued to the Department of Public Works, City of Brockton, Massachusetts; and
- Findings of Fact in Support of the Final Permit Decision.

The signature on this cover letter indicates formal issuance of the attached document.

If you have any questions, please contact Leslie O'Shea at 508-946-2837.

Very truly yours,

David A. DeLorenzo,
Bureau of Resource Protection
Southeast Regional Office

Enclosures

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This information is available in alternate format. Call Debra Doherty, ADA Coordinator at 617-292-5565. TDD Service - 1-800-298-2207.

DEP on the World Wide Web: <http://www.mass.gov/dep>



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Halifax, MA 02338

Communication for Non-English Speaking Parties (310 CMR 1.03(5)(a))

English

This document is important and should be translated immediately.

Spanish

Este documento es importante y se debe traducir inmediatamente.

Portuguese

Este original é importante e deve ser traduzido imediatamente.

Italian

Questo documento è importante e dovrebbe essere tradotto immediatamente.

Greek

Αυτό το έγγραφο είναι σημαντικό και πρέπει να μεταφραστεί αμέσως.

French

Ce document est important et devrait être traduit immédiatement.

Chinese (traditional)

這個文件重要和應該立刻被翻譯。
这个文件重要和应该立刻被翻译。

**Findings of Fact in Support of Final Permit Decision
RE: Water Management Permit 9P4-4-25-044.01**

In response to your application for a new permit to withdraw water from the Taunton Basin for the City of Brockton, and after reviewing the information that you have provided, the Department of Environmental Protection (the Department) hereby approves your application as noted herein in accordance with the Water Management Act (M.G.L. 21G).

In March 2002, the City of Brockton filed a Water Management Act (WMA) permit application to increase its authorized withdrawal from the Taunton Basin and to add the Pleasant Street Wellfield as a new withdrawal source. The Pleasant Street Wellfield is located on Monponsett Pond in Hanson, and is owned by the Town of Hanson. The Wellfield has been approved by the Department under the New Source Approval process, and in May 2000 was incorporated into the Town of Hanson's Taunton Basin permit #9P-4-25-123.01 as an additional withdrawal point, with no increase in Hanson's WMA authorized volume. The Town of Hanson and the City of Brockton have entered into an agreement that allows Brockton to use the Pleasant Street Wellfield for a limited time period. Hanson's Taunton Basin permit amendment has been appealed and the appeal is pending.

As required by M.G.L. c.21G, s. 11, 310 CMR 36.26 and 310 CMR 36.00, the Department makes the following Findings of Fact in support of Brockton's WMA permit #9P4-4-25-044.01, and includes herewith its reasons for approving the permit and for imposing the conditions of approval.

This permit #9P4-4-25-044.01 supersedes WMA permit #9P4-25-044.01 issued to the City of Brockton on June 1, 1991.

Permit Conditions:

Permit Condition #1 authorizes Brockton an increase in the Taunton Basin withdrawal volume from the 0.83 MGD (million gallons per day) authorized by WMA permit #9P4-25-044.01 to 1.58 MGD. The permitted withdrawal volume is in addition to the volume authorized by the City's WMA Registrations issued for the Taunton River Basin and the South Coastal Drainage Area. This permit, which authorizes a new withdrawal point and additional volume, allows Brockton the ability to meet the short-term demand. The permit also provides Brockton with the flexibility to manage all withdrawals in a manner that reduces the environmental impacts associated with those withdrawals. The Department expects Brockton to begin to develop a plan to manage withdrawals so as not to exceed the firm yield of all existing sources, while minimizing any environmental impacts associated with those withdrawals. The Department will require the development and implementation of such a plan in future permitting decisions, including 5 Year Review, permit amendment or permit modification, involving the City of Brockton. The volumes authorized in this permit are contingent upon the agreement between Brockton and Hanson. Should that agreement be amended, expire, or be altered in manner the volumes authorized and condition herein may be subject to modification.

Permit Condition #2 adds the Pleasant Street Wellfield as an authorized withdrawal point with an approved withdrawal rate. As noted above, the Pleasant Street Wellfield is owned by the Town of Hanson, and Brockton and Hanson have entered into an agreement to allow the City use of the Wellfield for a limited time period. The permit clarifies that while both permits are in effect, the cumulative withdrawal from the Pleasant Street Wellfield by any person shall not exceed 0.75 MGD.

In addition, Permit Condition 2 clarifies that operation of the Pleasant Street Wellfield is linked to the water level of Monponsett Pond, and the operation limits are specified by this condition. These limits have been included to ensure protection of the pond and to address the concerns of the Massachusetts Natural Heritage and Endangered Species Program (NHESP) regarding Eastern Pondmussel (*Ligumia nasuta*) and Tidewater Mucket (*Leptodea ochracea*) populations.

Permit Condition #3 requires submittal of monitoring plans for Monponsett Pond, Stump Brook and wetlands adjacent to the wellfield, and a contingency plan to address potential impacts to private wells. Once the plans have been reviewed and approved by the Department, they will be incorporated as a condition into Brockton's WMA permit and implementation of the plans will be required.

Permit Condition #4 notes the Department's approval of the Zone II delineation for the Pleasant Street Wellfield.

Permit Condition #5 specifies the requirements for Zone A protection of the Avon Reservoir.

Permit Condition #6 notes the approval of the wellhead protection program for the Pleasant Street Wellfield.

Permit Condition #7 establishes a performance standard of 10% or less for unaccounted-for water and the measures to be implemented by Brockton if the City does not meet this standard.

Permit Condition #8 establishes a performance standard not to exceed 65 gallons per capita per day for residential water use and the measures to be implemented by Brockton if the City does not meet this standard.

Permit Condition #9 establishes a performance standard that limits the seasonal increase (i.e., increase in summer water use compared to winter water use) system-wide by the City of Brockton and the Town of Whitman. The condition provides that summer use (use between May 1 and September 30) shall not be more than 1.13 of the winter use (use during the prior November 1 through March 31), i.e., a summer/winter ratio of 1.13. While the City's seasonal increase in water use has been very low, the ratio was established to provide a limit on that increase in the future to mitigate the impact of Brockton's withdrawals. A seasonal use ratio, rather than a fixed limit seasonal cap, is imposed because Brockton is an urban community with relatively small seasonal fluctuations; the ratio provides some additional flexibility in recognition of the communities' long term imposition of water use restrictions. Should the combined water use of Brockton and Whitman exceed the 1.13 summer/winter ratio, Brockton will be required to develop and implement an enhanced water conservation plan consistent with the requirements outlined in Special Condition #8.1. The Department will reevaluate this condition as Brockton develops additional sources.

Permit Condition #10 requires the City to implement a water conservation program targeting its ten largest water customers.

Permit Condition #11 requires the City to evaluate its consecutive system agreement with the Town of Whitman to ensure that the Whitman system is subject to conservation conditions consistent with those applied to Brockton and required by the 1992 *Water Conservation Standards for the Commonwealth of Massachusetts* approved by the Water Resources Commission. In particular, the Department requires that Brockton ensure that Whitman meet the Performance Standards for residential per capita daily water use of 65 gpcd, 10% unaccounted-for water, and implements conservation measures that allow Brockton and Whitman to meet the standard for Seasonal Water Use included in Special Condition #9.

Permit Condition #12 contains the general water conservation requirements.

Permit Condition #13 contains the general permit conditions applicable to all permittees.

Response to Public Comment:

On July 23, 2002, the Department conducted a public hearing regarding the permit application. Written comments on the application were also received during the public comment period. The following is a discussion of the issues raised and the Department's responses to these issues.

Concerns regarding the technical review process

Many commenters questioned various aspects of the technical review process and the evaluations made relative to the Department's approval of the Town of Hanson's WMA application for the Pleasant Street Wellfield. The Department maintains that the technical review process for the Pleasant Street Wellfield was complete and proper, and warranted the Department's issuance of the permit amendment to the Town of Hanson. Accordingly, the Department did not require that work previously completed in support of Hanson's permit be redone or changed in support of the City of Brockton's permit for the same wellfield. The Department accepts and relies upon the technical evaluations completed in support of the permit issued for the Pleasant Street Wellfield to Hanson.

Concerns regarding Monponsett Pond Water Level

As stated above, Permit Condition 2 clarifies that operation of the Pleasant Street Wellfield is linked to the water level of Monponsett Pond. Specifically, Condition 2.2 correlates an allowable water withdrawal rate to a specific surface water elevation at Monponsett Pond, with zero withdrawal allowed should pond level reach 51.7 Mean Sea Level (MSL). This same requirement is in the Hanson permit for the Pleasant Street Wellfield.

Concerns regarding the Eastern Pondmussel (*Ligumia nasuta*) and Tidewater Mucket (*Leptodea ochracea*) population of Monponsett Pond

NHESP's correspondence of July 31, 2002 expressed concerns regarding Brockton's WMA application and impacts to Eastern Pondmussel (*Ligumia nasuta*) and Tidewater Mucket (*Leptodea ochracea*) population of Monponsett Pond. Through subsequent correspondence between NHESP and the Department, it was clarified that NHESP is concerned about the proposed increase of the authorized pumping rate from 0.75 MGD to 1.00 MGD. The City of Brockton permit application did indicate that a higher permit rate (up to 1.00 MGD) may be requested in the future upon the completion and operation of the Pleasant Street Wellfield. The Department advised NHESP that an increase of the authorized withdrawal rate from Pleasant Street Wellfield to 1.00 MGD would require an application for a new WMA permit. Such a permit application would be subject to technical review of the impacts associated with the increased withdrawal rate, and would require public review under the MEPA and WMA processes. Therefore, NHESP continues to support the limitations, which they were instrumental in developing during review of the Hanson amendment application, for operation of the Pleasant Street Wellfield as stated in this permit.

Concerns regarding Stump Brook

Concerns were raised that the withdrawal at the Pleasant Street Wellfield could reduce streamflow in Stump Brook. An evaluation of the impacts to Stump Brook from the proposed withdrawal are discussed in Camp Dresser & McKee's February, 2000 *Technical Memorandum Pleasant Street Wellfield Withdrawals* (p. 41 of 46), submitted by Hanson with their WMA permit application (a copy of this document was included as **Attachment D** of Brockton's permit application). The Department concurred with the model assumptions, data evaluation, and conclusions. Condition 3.2 requires the development of a monitoring and operation plan for Stump Brook to ensure that discharge over the fish ladder meets the 0.90 MGD discharge between the months of October and May required by Legislation of 1969.

Concerns regarding impacts to Silver Lake and the Jones River

A number of commenters raised concerns about the impacts of the Pleasant Street Wellfield water withdrawal on Silver Lake and the Jones River located in the South Coastal Drainage Area. In accordance with the Water Management Act and the regulations 310 CMR 36.00, Brockton and the Town of Hanson conducted a complete analysis of the impacts to the subwatershed of the Taunton Basin from which the water is to be withdrawn, not to the subwatershed of Silver Lake and the Jones River. The Department has conducted a thorough review of this analysis and continues to accept and rely upon it to assess the impacts to that subwatershed.

As stated above in the finding of fact for Special Condition #1, it is the Department's position that use of the Pleasant Street Wellfield, as well as other potential sources of water, will provide the City of Brockton with needed redundancy, and will allow for flexibility in operation resulting in a lessening of impacts on all its water resources including Silver Lake. Further, the Department will require, by future permitting decisions, the City to develop and implement a plan that limits withdrawals to the firm yield of their sources and mitigates any impact of those withdrawals.

Concerns regarding Wetlands Impacts

Condition 3.3 requires a wetlands monitoring plan; the same requirement appears in the Hanson permit amendment for the Pleasant Street Wellfield. Permit Attachment A provides the Department's guidance for developing a wetlands monitoring program. The Department requires wetlands monitoring when the technical evaluation for a new well indicates there is the potential for impacts where environmentally sensitive resources exist.

Impact of State purchase of Northland Cranberry property

In 2002, the Massachusetts Division of Fish and Wildlife (MDFW) acquired approximately 1,600 acres formerly held by Northland Cranberry Company. Northland Cranberry's WMA registration for 2.69 MGD, held for the purpose of cultivating 273 acres of cranberry bog, was transferred to MDFW upon sale of the property.

The Department met with representatives of MDFW to discuss their plans for continued water use at this property. The MDFW representatives reported that large-scale cranberry farming will probably not take place on this property in the future. Water manipulation will be required, however, to restore the property and to re-establish fish and wildlife habitat; MDFW is developing a restoration plan for the site. Although the change in use of this property should result in significant reductions in water consumption, the Department did not require remodeling of area impacts. Therefore, the most conservative assumption has been retained, since as long as the MDFW holds the WMA registration they have the authority to reactivate full cranberry operations at the site.

Concern regarding Brockton's rate of Unaccounted-for Water (UAW)

Brockton's reported UAW rate has been consistently higher than the Water Resource Commission's goal of ten percent (10%). Since the City's last water audit (conducted in the mid-1990s), Brockton has implemented many changes and improvements to water department operations. The permit requires another comprehensive water audit to determine the locations of sources of UAW and to identify additional improvements.

WATER WITHDRAWAL PERMIT
MGL c 21G

This permit is approved pursuant to the Massachusetts Water Management Act (WMA) for the sole purpose of authorizing the withdrawal of a volume of water as stated below and subject to the following special and general conditions. This permit conveys no right in or to any property beyond the right to withdraw the volume of water for which it is issued.

PERMIT NUMBER: 9P4-4-25-044.01 **RIVER BASIN:** Taunton

PERMITTEE: City of Brockton Water Commission
Department of Public Works
39 Montauk Road
Brockton, MA 02301

EFFECTIVE DATE: February 26, 2004

EXPIRATION DATE: February 28, 2010

TYPE AND NUMBER OF WITHDRAWAL POINTS:

Groundwater: 1
Surface Water: 1

USE: Public Water Supply

DAYS OF OPERATION: 365

AUTHORIZED WITHDRAWAL POINTS:

| Source | Source Code |
|--|-------------|
| Avon Reservoir East D W Field Parkway, Brockton | 4044000-02S |
| Pleasant Street Wellfield Pleasant Street, Hanson | * |

* Source code will be assigned at time of issuance of permit to construct.

SPECIAL CONDITIONS

1. Authorized Annual Average Withdrawal Volume

This permit authorizes the City of Brockton to withdraw water from the Taunton River Basin at the rate described below. The volume reflected by this rate is in addition to the 0.04 MGD previously authorized to the City of Brockton under WMA Registration #425044.02 for withdrawal from the Taunton River Basin. The permitted volume is expressed in millions of gallons, both as an average daily withdrawal rate, and as a total annual withdrawal volume for each five-year period of the permit term.

The Department of Environmental Protection (the Department) bases these withdrawal volumes on the raw water withdrawn from the authorized water sources, and will use the raw water amount to assess compliance with the registered and permitted withdrawal volumes.

| <u>Five Year Periods</u> | <u>Authorized Raw Water Withdrawal Volumes</u> | | | |
|---|--|-----------------------|---|-----------------------|
| | <u>Authorized Permit Volume</u> | | <u>Total of Permit & Registration Volumes</u> | |
| | Daily Average (MGD) | Total Annual (MGY) | Daily Average (MGD) | Total Annual (MGY) |
| Period One, Years 2-5 6/1/1991 to 2/28/1995 | 0.83 | 302.95 | 0.87 | 317.55 |
| Period Two, Year 6-10 3/1/1995 to 2/29/2000 | 0.83 | 302.95 | 0.87 | 317.55 |
| Period Three, Years 11-14 3/1/2000 to 2/26/2004 | 0.83 | 302.95 | 0.87 | 317.55 |
| Period Three, Years 14-15 2/27/2004 to 2/28/2005 | 1.58 | 576.70 | 1.62 | 591.30 |
| Period Four, Years 16-20 3/1/2005 to 2/28/2010 | 1.58 | 576.70 | 1.62 | 591.30 |

[The City of Brockton shall report on the Annual Statistical Report both the raw and finished water volumes for the entire water system. Raw water volumes shall also be reported for individual sources.]

The City of Brockton shall not withdraw water from the Taunton River Basin in excess of the Total Raw Water Withdrawal Volumes stated above by more than a total of 36.5 MGY (on average 0.10 MGD) unless the Department issues a permit authorizing such a withdrawal. Unpermitted withdrawals in excess of the threshold volume are a violation of the Water Management Act.

In addition to the City of Brockton's authorized Taunton River Basin withdrawals, the City is authorized by WMA Registration #421044.01 to withdraw on average 11.11 MGD, or 4,055.15 MGY from sources in the South Coastal Drainage Area.

2. Maximum Daily Withdrawal and Operating Requirements

2.1 Maximum Daily Withdrawal Rate from Authorized Withdrawal Points

Withdrawals from individual withdrawal points are not to exceed the approved maximum daily rates listed below without specific advance written approval from the Department.

| Source | Maximum Daily Rate |
|---------------------------|---------------------------|
| Avon Reservoir | 1.30 MGD |
| Pleasant Street Wellfield | 0.75 MGD (520 gpm) |

To acknowledge the Town of Hanson's ownership of the Pleasant Street Wellfield, the wellfield has been listed as a withdrawal point in Hanson's WMA Permit. The City of Brockton and the Town of Hanson have entered into an agreement to allow the City use of the Wellfield for a limited time period. While both permits are in effect, the cumulative withdrawal from the Pleasant Street Wellfield by any person shall not exceed 0.75 MGD.

The Department must be notified at least thirty (30) days in advance of any proposed change in use and/or operation of the Pleasant Street Wellfield, including turning over operation of the Wellfield to the Town of Hanson. All changes in use and/or operation must be approved by the Department prior to implementing the change.

2.2 Monponsett Pond Levels

The Pleasant Street Wellfield shall be operated in accordance with the following requirements.

The maximum daily volume of withdrawal from the Pleasant Street Wellfield is dependent upon the following Monponsett Pond water level:

| Monponsett Pond Water Level | Maximum Daily Volume |
|---|-----------------------------|
| At and Above Mean Sea Level (MSL) 52.0' | 0.75 MG |
| Between MSL 52.0' to 51.9' | 0.50 MG |
| Between MSL 51.9' to 51.7' | 0.25 MG |
| Below MSL 51.7' | No Withdrawal Authorized |

2.3 Safe Yield Calculation for Avon Reservoir

Based on the information available to the Department, the safe yield of Avon Reservoir has been determined to be 0.83 MGD. No further safe yield work is required.

3. Pleasant Street Wellfield Monitoring and Action Requirements

3.1 Monponsett Pond

To ensure operation of the Pleasant Street Wellfield within the authorized withdrawal range specified by Condition 2, a plan for providing continuous pond level monitoring is to be developed and submitted to the Department for approval.

3.2 Stump Brook

A monitoring and operation plan is required to ensure unimpeded flow to the fish ladder at the Brockton control structure on Stump Brook. This plan will take into account the Legislation enacted in 1969 which requires a minimum discharge of 0.90 MGD over the Stump Brook fish ladder between the months of October and May.

The plan is to include provisions for utilizing the existing Brockton flow recorder at the control structure to ensure compliance with the Legislative requirement.

The Stump Brook monitoring and operation plan will also include provisions for periodic inspection of the brook channel above the Brockton control structure, and removal of excess vegetation and debris from the brook as necessary. It is noted that removal of vegetation and debris from the brook will be dependent upon approval from the Halifax Conservation Commission.

3.3 Wetlands

A monitoring plan for wetlands adjacent to the Pleasant Street Wellfield shall be developed in accordance with Attachment A and submitted to the Department for approval. Baseline wetland monitoring will be conducted prior to operation of the Pleasant Street Wellfield.

3.4 Private Wells

A contingency plan is required to address potential impacts to the seven (7) private wells located on Woodbine Avenue Extension and Pleasant Street. Proposed remedial actions must be mutually agreed upon by the owners of the private wells and the operator of the Pleasant Street Wellfield.

3.5 Submittal of Plans

The monitoring, operation and contingency plans required by the above conditions shall be submitted to the Department for approval with the plans to construct the Pleasant Street Wellfield. The Department will not approve the application to construct until the required plans have been approved by the Department.

3.6 Implementation of Plans

Once the required plans have been approved by the Department, this permit will be modified to require implementation of the plans.

Until such time as the operation of this source is turned over to the Town of Hanson, the City of Brockton is responsible for implementing the Pleasant Street Wellfield monitoring, operation and contingency plans approved by Department.

4. Zone II Delineation

Department records show that the proposed Pleasant Street Wellfield has an approved Zone II delineation, therefore, no further Zone II work is required as a condition of this permit.

5. Zone A Delineation

By February 28, 2006 the City of Brockton's Water Commission must:

- develop a Department approved surface water supply protection plan to meet the requirements of 310 CMR 22.20C(1)(d)(4);
- implement zoning or nonzoning controls that meet the requirements of 310 CMR 22.20C(2) to protect the portion of Zone A that lies within Brockton, and
- demonstrate that it has used best effort to have local zoning or nonzoning controls that meet the requirements of 310 CMR 22.20C(2) adopted within the Avon to protect the portion of the Zone A that lies within Avon.

6. Wellhead Protection

Department records indicate that the Town of Hanson meets the requirements of 310 CMR 22.21(2) for the Pleasant Street Wellfield, therefore, no further wellhead protection work is required of the City of Brockton as a condition of this permit.

7. Performance Standard for Unaccounted-for Water

Unaccounted-for water should be 10% (ten percent) or less.

Brockton's Annual Statistical Report shall provide a detailed calculation of its unaccounted-for water both in gallons and percent of total withdrawn and purchased. Unaccounted-for water is the difference between water pumped or purchased and water that is metered or confidently estimated and should include: master meter inaccuracies; domestic and non-domestic meter under-registration; errors in estimating for stopped meters; over-registering revenue meters; unauthorized hydrant openings; unavoidable leakage; recoverable leakage; illegal connections; standpipe overflows, and data processing errors.

7.1 Control of Unaccounted-for Water

The City of Brockton shall take the following minimum actions to meet the performance standard for achieving an unaccounted-for water rate of 10% or less.

Water System Water Audit

Within six months of the effective date of this permit, the City of Brockton shall submit to the Department for review and approval a proposed scope of work and schedule to conduct a comprehensive water audit of the Brockton water system. The water audit shall follow the general guidelines in the Department's *Water Audit Leak Detection Project Guidance Manual* (February 1990), except that the City of Brockton should not postpone undertaking the leak detection work until the conclusion of the water audit. Brockton followed this same guidance manual when it conducted the last water audit in 1998.

The water system audit required by this condition must be completed by February 28, 2006.

Metering

Full metering shall be provided for all service connections, including public and municipal buildings and users, with meters of proper size and accuracy to measure water flow within the accuracy as specified by the American Water Works Association (AWWA) standards for the particular meter.

As part of the scope of work for the Water Audit, the Brockton shall submit a plan and schedule for ensuring all service meters accurately measure, within AWWA specified standards, the volume of water used by the City's customers. The plan shall include provision for sufficient funds in the annual Water Department budget to recalibrate, repair or replace meters as needed. The water audit shall address the issue of meter sizing versus flow usage.

The City of Brockton shall continue its ongoing program to inspect and replace as necessary individual service meters that are over ten years old.

The City of Brockton shall continue to calibrate all master meters on an annual basis.

Leak Detection

At a minimum, the City of Brockton shall conduct a leak detection survey of the entire distribution system every two years. In addition, the City of Brockton shall perform a leak detection survey of its entire distribution system whenever the rate of unaccounted-for water is greater than ten percent (10%) or whenever the percentage of unaccounted-for water increases by five percent (5%) or more (for example, an increase from 3% to 8%) over the percentage reported for the prior calendar year. The report of the leak detection survey shall be submitted to the Department by February 28 of the year following the survey year. The report shall provide record of any leaks uncovered as a result of the survey or otherwise identified, and the estimated water savings as a result of the repair.

Leak Repair

The City of Brockton shall maintain leak repair reports and make them available for inspection by the Department.

Leaks, including leaks in any service mains up to the service meter, shall be repaired as soon as possible, but no later than seven (7) days after detection.

Water Treatment Plant Audit

If during any calendar year the difference between the quantity of the raw water entering each of the City of Brockton's treatment plants, including the Silver Lake Treatment Plant, that will be treating water from the Pleasant Street Wellfield, and the quantity of the finished water entering the distribution system from that treatment plant exceeds five percent (5%), the City of Brockton shall submit to the Department for its review and approval a scope of work and schedule for completing an audit of the treatment plant. This scope of work and schedule shall be submitted by February 28 of the following year. The scope of work shall require an evaluation of the operations at the treatment plant and include recommended actions that can reduce water consumption during the treatment process, and propose a schedule for implements actions. The City shall complete the water treatment plant audit in accordance with the scope of work and schedule approved by the Department, and submit to the Department for review and approval a report documenting the results of the water treatment plant audit including a plan and schedule for reducing the volume of water lost during the treatment process. The City of Brockton shall implement the actions recommended in the water audit report as approved by the Department in accordance with a schedule approved by the Department.

8. Performance Standard for Residential Per Capita Water Use

Residential per capita water use shall not exceed 65 gallons per day.

Brockton shall report its residential gallons per capita per day water use as part of its Annual Statistical Report. The residential gallons per capita per day water use is the total volume of residential water use in gallons divided by the population served, divided by 365 days. The source of the data used to establish the service population and the year in which this data was developed shall be provided.

8.1 Control of Residential Per Capita Water Use

If in any year, beginning with calendar year 2004, the City of Brockton fails to comply with the Performance Standard for Residential Per Capita Water Use, the City of Brockton shall develop and implement an enhanced water conservation plan for the following calendar year. For any year in which the City of Brockton is required to develop and implement an enhanced water conservation plan, the City of Brockton shall submit, along with its Annual Statistical Report, a report documenting all actions taken by the City of Brockton to develop and implement the enhanced water conservation plan.

The enhanced water conservation plan may include without limitation the items listed below:

- Adoption and enforcement of a bylaw or regulation to require moisture sensors or similar control technology on automatic sprinklers;
- Adoption and enforcement of a bylaw or regulation to limit the amount of land clearing for the creation of lawns;
- Adoption and enforcement of a bylaw or regulation to promote infiltration of storm water to recharge groundwater at a rate 1.5 times the volume of recharge for new development projects and a rate of 1.0 times the volume of recharge for redevelopment projects for the appropriate hydrologic group as identified in Standard 3 of the DEP Storm Water Management Standards;
- Implementation of mandatory water use restrictions on nonessential outside water use. For the purpose of this Permit, the term “nonessential outside water use” is defined to include those uses that do not have health or safety impacts, are not required by regulation, and are not needed to meet the core functions of a business or other organization.
- Irrigation of recreational fields and public parks in accordance with the Water Resources Commission’s May 2002 *Guide to Lawn and Landscape Water Conservation*;
- Encouragement of the use of cisterns or rain barrels for outside watering thru the use of a rebate or at cost program;
- Enhanced public education outreach.

At a minimum, the enhanced water conservation plan shall meet the requirements set forth below.

- If Brockton fails to comply with the performance standard for keeping residential per capita water use at or below 65 gallons per day, the enhanced water conservation plan shall include the implementation of a program to make water saving devices such as faucet aerators, low flow shower heads and toilet displacement bottles/dams available to its customers at cost and to provide rebates or other incentives for the purchase of low flow appliances (washing machines, dish washers and toilets) and the installation of moisture sensors or similar control technology on irrigation systems.

- An enhanced water conservation plan required by this permit shall include: (1) submission of a report that evaluates the effectiveness of a differential rate for seasonal water use as a tool for encouraging water conservation; (2) implementation of any changes to the current rate structure that will enable Brockton to encourage water conservation such as a differential rate for seasonal water use, and (3) notification to the Department of the changes along with the reason for these changes.
- The Department may require the City to implement restrictions on nonessential outside water use that are more stringent than the restrictions set forth above.

9. Performance Standard for Seasonal Water Use

The combined water use by the City of Brockton and the Town of Whitman between May 1 and September 30 shall not exceed the water use for the prior winter season, defined as the period between November 1 and March 31, by a summer to winter ratio of 1.13. If the combined water use of Brockton and Whitman exceeds the summer to winter water use ratio of 1.13, Brockton will develop and implement an enhanced water conservation plan consistent with the requirements outlined in Special Condition #8.1 above. The plan shall also outline Brockton's and Whitman's efforts to control nonessential outside water use over the previous calendar year, and those efforts proposed for the upcoming calendar year to ensure compliance with this condition. Should a plan be required, Brockton shall submit said plan with its Annual Statistical Report.

10. Commercial and Industrial Conservation Program

The City of Brockton shall implement a program to reduce water use by its ten (10) largest customers. As part of the required Water Audit Report, Brockton shall report on the effectiveness of this program. Upon receipt of this evaluation, the Department will take whatever action it deems appropriate to promote the interests of the Water Management Act including, without limitation, requiring the City to take additional actions to reduce commercial, industrial and municipal water use.

11. Consecutive System Compliance

By August 31, 2004 the City of Brockton shall provide a report summarizing its ability to require, through any consecutive system agreement, the Town of Whitman to comply with the performance standards for unaccounted-for water use outlined in Special Condition #7, residential per capita daily water use outlined in Special Condition #8, and general water conservation outlined below in Special Condition #12. The Report must summarize Whitman's current efforts to meet those standards and Brockton's ability now and in the future to require compliance. A copy of the most recent Inter-municipal Agreement (IMA) between Brockton and Whitman for the supply of water to Whitman is to be included with the report.

12. General Water Conservation Requirements

Outdoor Water Use

The Department acknowledges the sections of City's Ordinances regarding outdoor water use and water bans. The City is expected to fully implement those sections of the Ordinances as a condition of this permit. The City of Brockton shall notify the Department in writing within 14 business days of implementing water use restrictions. The City shall also notify the Department within 14 business days should it modify or eliminate the Water Use Restriction Bylaw.

Pricing

The water pricing structure shall not be a decreasing block rate structure.

The City of Brockton shall continue to ensure that water supply system operations are fully funded by water supply system revenues. The pricing system shall at least reflect the full cost of supplying water, including but not limited to:

- Administrative costs;
- Staff salaries, benefits, insurance and pension costs;
- Distribution system operation, maintenance and repair, including leak detection and repair costs and metering costs;
- Pumping costs and utilities;
- Treatment costs;
- Capital replacement costs, capital depreciation and debt service;
- Costs associated with water conservation programs and public education programs;
- Watershed or wellhead purchase and/or protection costs and land acquisition;
- Emergency planning.

Plumbing

The City of Brockton shall implement a program to work with Brockton's Plumbing Department to enforce the March 1, 1989 plumbing code for new construction and building rehabilitation where installation of water saving devices and low flow toilets are required.

Public buildings shall be retrofitted with water saving devices (such as faucet aerators, low flow shower heads, toilet displacement bottles/dams, low flow toilets, and automatic shut off faucets). The City of Brockton shall submit to the Department, as part of the Water Audit Report required by Condition 7.1, an accounting of all public buildings and their status of compliance with this condition. If any public buildings are not retrofitted with water saving devices, the City of Brockton shall submit a plan and schedule to complete the retrofitting. The schedule shall specify that retrofitting will be completed no later than December 31, 2008. Thereafter Brockton shall implement the plan and schedule, and notify the Department in writing when the retrofit is complete.

Water Main Flushing

The need for water main flushing and the use of water in construction shall be metered or estimated as appropriate to assist in determining demand. Volumes flushed to waste shall be reported annually in the appropriate section of the Water Supply Annual Statistical Report.

Education

The City of Brockton shall continue its current public education program and consider additional educational activities. The City of Brockton shall also continue to provide customers of the public water system with literature emphasizing:

- The cost of providing water;
- Investments in efficiency and conservation will provide consumers with long-term savings;
- How water use fluctuates throughout the year;
- The environmental benefits of reducing water demand.

Bill stuffers with water conservation tips or water saving messages shall, at a minimum, be included annually with customer's water bills, or as a separate mailing. Copies of this information shall be made available to the Department upon request.

13. General Permit Conditions (applicable to all permittees)

No withdrawal in excess of 100,000 gallons per day over the registered volume (if any) shall be made following the expiration of this permit, unless before that date the Department has received a renewal permit application pursuant to 310 CMR 36.00.

1. **Duty to Comply** The permittee shall comply at all times with the terms and conditions of this permit, the Act and all applicable State and Federal statutes and regulations.
2. **Operation and Maintenance** The permittee shall at all times properly operate and maintain all facilities and equipment installed or used to withdraw up to the authorized volume so as not to impair the purposes and interests of the Act.
3. **Entry and Inspections** The permittee or the permittee's agent shall allow personnel or authorized agents or employees of the Department to enter and examine any property for the purpose of determining compliance with this permit, the Act or the regulations published pursuant thereto, upon presentation of proper identification and an oral statement of purpose.
4. **Water Emergency** Withdrawal volumes authorized by this permit are subject to restriction in any water emergency declared by the Department pursuant to MGL c 21G ss 15-17, MGL c 150 ss 111, or any other enabling authority.

5. **Transfer of Permits** This permit shall not be transferred in whole or in part unless and until the Department approves such transfer in writing, pursuant to a transfer application on forms provided by the Department requesting such approval and received by the Department at least thirty (30) days before the effective date of the proposed transfer. No transfer application shall be deemed filed unless it is accompanied by the applicable transfer fee established by 310 CMR 36.37.
6. **Duty to Report** The permittee shall submit annually, on a form provided by the Department, a certified statement of the withdrawal, such report to be received by the Department by the date specified by the Department. Such report must be mailed or hand delivered to:
- Commonwealth of Massachusetts
Department of Environmental Protection
Water Management Program
One Winter Street
Boston, MA 02108
7. **Duty to Maintain Records** The permittee shall be responsible for maintaining withdrawal records as specified by this permit.
8. **Metering** Withdrawal points shall be metered. Meters shall be calibrated annually. Meter shall be maintained and replaced as necessary to ensure the accuracy of the withdrawal records.

APPEAL RIGHTS AND TIME LIMITS

This permit is a decision of the Department. Any person aggrieved by this decision may request an adjudicatory hearing. Any such request must be made in writing, by certified mail and received by the Department within twenty-one (21) days of the date of receipt of this permit.

No request for an appeal of this permit shall be validly filed unless a copy of the request is sent by certified mail, or delivered by hand to the local water resources management official in the city or town in which the withdrawal point is located; and for any person appealing this decision, who is not the applicant, unless such person notifies the permit applicant of the appeal in writing by certified mail or by hand within five (5) days of mailing the appeal to the Department.

CONTENTS OF HEARING REQUEST

310 CMR 1.01(6)(b) requires the request to include a clear and concise statement of the facts which are the grounds for the request and the relief sought. In addition, the request must include a statement of the reasons why the decision of the Department is not consistent with applicable rules and regulations, and for any person appealing this decision who is not the applicant, a clear and concise statement of how that person is aggrieved by the issuance of this permit.

FILING FEE AND ADDRESS

The hearing request, together with a valid check, payable to the Commonwealth of Massachusetts in the amount of \$100 must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, Ma. 02211

The request shall be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below.

EXEMPTIONS

The filing fee is not required if the appellant is a city or town (or municipal agency), county, district of the Commonwealth of Massachusetts, or a municipal housing authority.

WAIVER

The Department may waive the adjudicatory hearing filing fee for any person who demonstrates to the satisfaction of the Department that the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request, an affidavit setting forth the facts which support the claim of undue hardship.

ATTACHMENT A

Wetland Hydrology Monitoring Guidance for Water Withdrawal Permit Compliance

Note: (see Glossary for **bolded** words/phrases)

Preamble

Wetland plant community structure and composition and the formation of hydric soils are driven by the presence and characteristics of wetland hydrology [per *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (FICWD 1989) Part II, Section 2.0].

Monitoring of resource areas under the jurisdiction of the Massachusetts Department of Environmental Protection (the Department) for compliance with Water Management Act (as implemented at 310 CMR 36.00) Water Withdrawal Permits shall be conducted at the discretion of the Department whenever it is determined that the operation of a proposed public water supply well may have an adverse impact on **wetland hydrology**. Monitoring shall focus on investigating the potential for a drop in the **apparent water table** within the substrate of vegetated wetlands due to the affects of a public water supply well on groundwater elevation. The Department will review the results of the monitoring and at the conclusion of the five (5)-year compliance review determine if the wetland hydrology monitoring plan should be continued, revised, or discontinued.

The following standards and basic techniques shall be employed in the design and implementation of a document to be referred to as a “Wetland Hydrology Monitoring Plan”. A draft “Wetland Hydrology Monitoring Plan” shall be submitted to the Department prior to implementation. The Department reserves the right to modify the plan in order to assure compliance with a Water Withdrawal Permit. A “Wetland Hydrology Monitoring Report” detailing the findings of the preceding calendar year must be submitted to the Department annually.

Standards and Basic Techniques

Define the Study Area

1. With the input of the Department, define the geographic extent of the study area. Unless otherwise instructed, the study area shall consist of all jurisdictional vegetated wetlands [see 310 CMR 10.00] within the **zone of influence** of the proposed wellhead.
2. Describe each distinct wetland plant community within the study area relative to its US Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) classification and Dominance Type [see *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin, et al 1979)]. Most critical in this inventory is a description of the water regime modifier. The water regime modifier is to be initially determined from an analysis of evidence found on-site and collateral data (see below), and is a long-term descriptor of wetland hydrology within the plant community. Additional to the water regime modifiers listed in Cowardin, there is one (1) specifically adopted for the northeastern United States by the USFWS’ NWI Regional Wetland Coordinator. This is the “seasonally flooded/saturated” water regime modifier (“**E**” on NWI maps). It is defined as follows:

“Floods (sic: technically **inundated**) most years for two weeks or more during growing season and remains saturated near the surface for most of the growing season” [“NWI Maps Made Easy: A User’s Guide to National Wetlands Inventory Maps of the Northeast Region” (Smith 1991)].

3. Delineate wetland plant community boundaries on a **site plan**. The resultant **map units** (polygons) shall be labeled with the appropriate NWI **alphanumeric classification** and Dominance Type.

Collection of Wetland Hydrology Data

4. Establish at least one (1) “**observation plot**” within each distinct map unit (polygon). Base the plot position and dimensions on criteria in *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* [MADEP 1995] (see Chapter 2, page 11 and elsewhere). At a minimum, there shall be four (4) observation plots for a given study area.
5. Color photographs captured from a fixed location and angle shall be taken as a visual record of each observation plot.
6. Photointerpret high-resolution aerial photography in order to refine the water regime modifier assigned to each map unit. Aerial photography from a number of different years should be interpreted. Reliable wetland photointerpretation can only be achieved using leaf-off photography, preferably color-infrared. The applicant is advised to consult “**Methods to Determine the Hydrology of Potential Wetland Sites**” [US Army Corps of Engineers WRP Technical Note HY-DE-4.1, January 1998] for *general* guidelines. For additional information on wetland aerial photointerpretation techniques and standards contact the Department’s Massachusetts Wetlands Inventory or visit the NWI’s homepage [<http://www.nwi.fws.gov/>].
7. Analyze other collateral data sources to further refine the assignment of water regime modifiers. Tabulate data on mapped soil series [US Department of Agriculture, Natural Resources Conservation Service county soil surveys], Massachusetts Wetlands Inventory Program mapping classifications, NWI map alphanumeric codes, Federal Emergency Management Agency Flood Insurance Rate Maps, hydrogeomorphic classification, etc.
8. Establish a shallow monitoring well adjacent to a representative portion of each observation plot. The shallow monitoring wells shall be constructed, installed, and operated in accordance with “**Installing Monitoring Wells/Piezometers in Wetlands**” [US Army Corps of Engineers WRP Technical Note HY-IA-3.1, August 1993]. Record water table levels on a monthly basis during the growing season of each sampling year. Record evidence of capillary fringe saturation, or at least describe its influence on the root zone. Establish a staff gauge at the well location in order to record surface inundation in terms of depth *and* duration. Estimate the areal extent of surface inundation for areas of mound-and-pool microtopography within each observation plot. Also record source(s) of wetland hydrology on site (ponding, overbank flooding, interception of groundwater table, sheet flow from surrounding upland, seep, etc.).

9. Provide a description of standard indicators of wetland hydrology within each observation plot using approved US Army Corps of Engineers indicators. These include: visual observation of inundation; visual observation of soil saturation; watermarks; drift lines; sediment deposits; drainage patterns within wetlands; oxidized channels (rhizospheres) associated with living roots and rhizomes; water-stained leaves; surface scoured areas; and morphological plant adaptations. [see *Corps of Engineers Wetlands Delineation Manual* (Department of the Army, Waterways Experiment Station, Environmental Laboratory, Technical Report Y-87-1, 1987); and *Federal Manual for Identifying and Delineating Jurisdictional Wetlands* (Federal Interagency Committee for Wetland Delineation 1989)].

Collection of Supportive Collateral Data

10. Identify soils within each observation plot using *Field Indicators for Identifying Hydric Soils in New England* [NEIWPCC (Version 2, 1998) or later version]. Analysis of soil profiles should specifically reference hydrologic characteristics included within the technical definition of hydric soils, natural soil drainage classes, and high water table/flooding data specific to the soil series encountered [see *Hydric Soils of New England* (Tiner and Veneman 1987)].
11. Prepare a description of the plant community within each observation plot using Section I of the “DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form” (Appendix G). Determine through scientific literature search and/or professional experience the water regime affinity(ies) of the particular wetland plant communities found within the observation plots. Compare or contrast these affinities with the water regime modifier initially assigned to each observation plot, and offer an explanation of any discrepancies observed. Identify vascular plants to the species level. Scientific nomenclature should follow the most recent classification found within *The Vascular Plants of Massachusetts: A County Checklist* (Sorrie & Somers 1999). Wetland Indicator Categories should follow the *1995 Supplement to the List of Plant Species that Occur in Wetlands: Northeast (Region 1)* (Tiner, et al. 1995). Identify bryophytes to the appropriate genus. The plant community data collected on Appendix G’s shall be solely used to characterize the general ecology and hydrology of each observation plot. Said data is not intended for use in statistical change analysis of the plant community.
12. The applicant shall determine the acidity (pH) of free water within at least one (1) of the established observation plots during the initial baseline data collection. This measurement shall be used to confirm the NWI water chemistry modifier assigned to each plot.
13. Compare data collected to climatological data from a station as close as possible to the observation plot. Climatological anomalies should be accounted for within the data analysis. The applicant is advised to consult the US Department of Agriculture, Natural Resources Conservation Service, National Water and Climate Center, WETS Tables for additional climatological data. See (http://www.nrcs.usda.gov/water/w_clim.html)

Data Analysis

15. The applicant will provide a complete and thorough description of wetland hydrology at each observation plot. The synthesis of this data will lead to a long-term “model” of the wetland hydrology at the observation plot. Once established, detected changes within the observation plot may be measured against the model, and significant changes illuminated for further analysis.
16. Potential sources of bias should be identified. Is there a potential for a significant change in the rate of evapotranspiration within the observation plot over time? (e.g., is the observation plot subject to disturbance; increasing levels of canopy shading over time; are there components of the plot’s plant community that are recognized early and mid-successional species?) Does the observation plot exhibit evidence of past land use practices (plow layer, foundation species such as *Vinca minor*, tree stumps, etc.)? Is there any evidence of plant pathology or extensive herbivory that could lead to a shift in plant community (eastern tent caterpillars, fungal diseases, gypsy moth infestation, etc.)?
17. A control observation plot is not recommended unless stringent and defensible means of eliminating and/or accounting for bias are undertaken. As a result, analysis of generated data will need to be strongly tied to the model established for wetland hydrology, and observed sources of bias should still be fully explored.
18. Analysis of hydrologic shift based upon correlations between wetland indicator status and water regime affinity is discouraged, unless supportive scientific literature indicates *species-specific* correlations [see *National List of Plant Species that Occur in Wetlands* (Reed 1988)].
19. ***The Department will rely heavily upon data generated from #8 in order to assess and respond to any detrimental impact to the study area. Scientifically relevant observances of wetland hydrology generated from the analysis at #8 that are not related to climatological or other natural phenomena shall be considered linked to the operation of the public water supply well, and will be just cause for Departmental review and/or manipulation of data collection protocol and/or well operation until such time as wetland hydrology has been returned to normal parameters. If, in the opinion of the Department, the sampling procedure detailed at #8 is deemed to be insufficient to elucidate such change, the Department reserves the right to modify #8 accordingly.***
20. The applicant shall include a thorough analysis of the data within the annual draft and final “Wetland Hydrology Monitoring Reports” and any plans, summaries, etc. submitted to the Department. This shall be accomplished using standard and defensible scientific principles, and shall consider the sum total of collected data being submitted, the model for wetland hydrology developed by the applicant for the study area, and an analysis of observed or expected sources of bias which may compromise the data set. Submittals to the Department of raw or summarized data without principled analysis shall be considered insufficient.

Mitigation

21. Once per growing season the study area shall be inspected for the presence/absence of non-native and/or **noxious** invasive plant species, including but not restricted to glossy buckthorn (*Rhamnus frangula*), purple loosestrife (*Lythrum salicaria*), Asiatic bittersweet (*Celastrus orbiculata*), and the native common reed (*Phragmites australis*). If any activity [as defined at 310 CMR 10.04 (Activity)] performed by the applicant, whether permitted or otherwise, is demonstrated or may be directly linked to the establishment and/or population increase of non-native and/or noxious invasive plant species within the study area, the applicant shall be responsible for the elimination of that species. The applicant shall alert the Department in a timely manner when non-native and/or noxious species are first documented within the study area, and upon such notice will consult with the Department's Wetlands and Waterways Program to develop an eradication/control plan. Said plan shall be submitted to the Department for review and acceptance. The applicant shall be responsible for identifying and obtaining any required permits that may be necessary in order to implement said plan.

Glossary

Alphanumeric Classification A letter-numeral code which is used to abbreviate NWI classifications. Refer to the collar of NWI maps or to the NWI homepage [<http://www.nwi.fws.gov/>] for details.

(Apparent) Water Table "The upper surface of ground water *or* that level below which the soil is saturated with water. It is at least 6 inches thick and persists in the soil for more than a few weeks" (emphasis added) [*Corps of Engineers Wetlands Delineation Manual* (Department of the Army, Waterways Experiment Station, Environmental Laboratory, Technical Report Y-87-1, 1987)]

Map Unit A single polygon (or symbol, linear feature, etc.) on a map whose boundary encloses a homogenous cover type or other thematic category.

Noxious Plant Species Typically, an indigenous species of plant that, due to human-induced causes, out-competes other native species within a given habitat; and thus reduces the biodiversity and other functions provided by that habitat. Common reed (*Phragmites australis*) in disturbed salt marsh habitat is an example.

Observation Plot A circular boundary placed horizontally on the substrate of a wetland within a relatively homogenous plant community, and used to collect various ecological data. An imaginary cylinder projects vertically both in the upward and downward directions. Ecological parameters (typically plant community composition/structure; soil characteristics; and evidence of surficial and sub-surface hydrology) are sampled within the confines of this cylinder.

Pit-and-Mound Microtopography A wetland substrate composed of elevated mounds of unconsolidated material and/or rock fragments interspersed with deeper pools. The pools are typically much wetter on average than the mounds. The mounds often support the majority of woody plant species within pit-and-mound wetlands.

Site Plan A large-scale map of a small area. For the purpose of the “Wetland Hydrology Monitoring Plan”, a site plan shall include: a scale bar, a compass rose, the zone of influence or other demarcation of the study area, location of all wells (both public water supply and research, existing and proposed) within the study area, resource area map units, location and identifying code of each observation plot, topographic contours, man-made surfaces.

Wetland hydrology “...all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season. Areas with evident characteristics of wetland hydrology are those where the presence of water has an over-riding influence on characteristics of *vegetation* and *soils* due to anaerobic and reducing conditions, respectively” (emphasis added) [*Corps of Engineers Wetlands Delineation Manual* (Department of the Army, Waterways Experiment Station, Environmental Laboratory, Technical Report Y-87-1, 1987)]. Included within this concept are the following categories:

- | | |
|-------------------|--|
| <i>Flooded</i> | “A condition in which the soil surface is temporarily covered with water from any source, such as streams overflowing their banks, runoff from adjacent or surrounding slopes, inflow from high tides, or any combination of sources.” |
| <i>Inundation</i> | “A condition in which water from any source temporarily or permanently covers a land surface.” (flooding + ponding) |
| <i>Ponded</i> | “A condition in which water stands in a closed depression. Water may be removed only by percolation, evaporation, and/or transpiration.” |
| <i>Saturated</i> | “A condition in which all easily drained voids (pores) between soil particles in the root zone are temporarily or permanently filled with water to the soil surface at pressures greater than atmospheric.” |

Zone of Influence “...a lowering (drawdown) of water levels in an area around the well” ...caused by... “(t)he withdrawal of water by a well” [“Guidelines for Delineation of Wellhead Protection Areas” EPA 440/6-87-010]

END OF ATTACHMENT A